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SARATOGA
WATERS.

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UNITED STATES OF AMERICA



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Henry Sturgis
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SARATOGA WATERS.

SARATOGA WATERS,

OR THE

INVALID AT SARATOGA.

BY M. L. NORTH, M. D.

A RESIDENT PHYSICIAN.

NEW YORK.

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CONTENTS.



	Page
CHAPTER I.	
Preliminary Observations, - - - - -	9
CHAPTER II.	
Professional advice before leaving home, - -	14
CHAPTER III.	
The medicinal character of the Saratoga Waters, -	16
CHAPTER IV.	
The same subject, continued, - - - - -	20
CHAPTER V.	
The comparative advantages of Saratoga Springs as a resort for Invalids, - - - - -	25
CHAPTER VI.	
The internal use of the Saratoga Waters, - -	31
CHAPTER VII.	
Same subject, - - - - -	46
CHAPTER VIII.	
The external use of the waters. Baths, - -	58

THE
INVALID AT SARATOGA.

CHAPTER I.

INTRODUCTORY REMARKS.

TO the INVALID, whom infirmities have depressed, whom pains have harrassed, and whose hopes of regaining health have hitherto proved delusive, the enquiry—"SHALL I VISIT SARATOGA?" is one of no ordinary moment. Home must be abandoned—toil and exposure encountered—the supervision of domestic concerns and of business suspended—expense incurred—strange faces and scenes met—new lodgings, new accommodations, new reciprocities established; and, often, what is most painful of all, a beloved and trusted family physician exchanged for a stranger.

The healthy, the fashionable and the pleasure seeking cannot appreciate, at all, the sacrifices and painful efforts that are often made by those whom they meet at the springs. Yet what is toil, what estrangement from home, what a few days of pain or trouble among strangers, what the loss of money, what a few weeks of pilgrimage even; if death can be averted, if pains can be chased away, strength, appetite and spirits restored, and all the delightful sensations of health revisit the sufferer?

That such have been the happy results of a resort to the Saratoga Fountains, many thousands can testify. Indeed they do testify and have testified it: and it is through their noiseless testimony, which is spreading from city to city and from state to state, that we see the multitudes of pilgrims to this place so rapidly increasing. Yet this is not the only report that emanates from this valley. Such are the power and efficacy of these waters and their influence over the animal economy, that many who use them improperly return to their friends with increased infirmities and cutting disappointment. This is a notorious fact and of every day occurrence, notwithstanding the

excellent directions left by the late Dr. Steel.

It was often, no doubt, his painful lot as it has been that of the writer of these pages, during the two seasons past, to see these excellent medicines which flow from the hand of nature through our valley, so misapplied as to become undeniable evils. But, though painful, this is not to the observing physician, any thing out of the common course of events. Morphine, quinine, calomel, Epsom salts and many other medicinal agents whose effects are most clearly beneficial, are all liable to produce disastrous effects when misapplied.

To the healthy and well balanced frame, a tumbler of the sparkling and delicious beverage, although it contains over 37 grains of various saline matters, besides the gases, can do little mischief. And if ten or twelve tumblers are taken, the conservative powers of such a system will usually manage to evade the evil. But, when the patient comes laboring under disease, with the healthy action suspended and the economy in a generally deranged condition, the swallowing of ten or fifteen tumblers of this potent medicine every morning, is by no means a matter of trifling or impunity. How many, after various repetitions

of these absurd and ill judged potations, go home in disgust and despair, with every inflammatory tendency aggravated, and every irritation increased by the very remedy which has restored health to their neighbors and friends.

This, I say again, is no enigma. But how shall this great evil be remedied? How shall this abuse be suppressed? How shall the valetudinarian—the diseased wanderer—be persuaded not to trifle with his life and health by an unwarranted and misdirected application of these waters? In these enquiries every physician and every chronic patient in the country are interested. So is every member of this community. Every friend of humanity residing among these Fountains of Health, cannot but feel a deep and laudable ambition that these waters which are healing so many, and with effects so marked as to leave not a shadow of ambiguity, should *never* prove injurious.

But none, except the patients and their friends, can feel so deep and sensible an interest in the proper application of these remedies, both internally and externally, as the physicians who reside permanently at the fountains

and whose business it is to direct enquirers to a safe and proper course. It is this which has led the writer to the publication of this little Manual. Having come, himself, to this place for the establishment of his own broken health, and having been unexpectedly induced to take up his residence here, he must be excused for saying, that he feels an irrepressible desire to contribute in spreading as widely as possible, what he conceives to be correct information respecting the nature and proper use of the mineral remedies of Saratoga.

To aid his professional brethren abroad, he inserted several communications, a year ago, in the Boston Medical and Surgical Journal, on the Saratoga waters, which were copied into one or more weekly newspapers. From the reports and conversation of many invalids last season, he found that these papers were read not only by physicians but by patients; and, as they coincide with the object of the present publication he has ventured to introduce such parts of them as may be useful and intelligible to the common reader.

CHAPTER II.

PROFESSIONAL ADVICE BEFORE LEAVING HOME.

THE writer has often thought that if invalids when coming here, would have a thorough conference with their regular physician previous to leaving home, they might receive such directions as would be not only useful but a matter of economy. Many come here without any professional advice or direction or preparation. Having worn out their physicians, or been the round of the nostrums, they resolve to spend *two* or *three* weeks drinking and bathing in the pools of Saratoga! A visit to the Springs is somehow to cure them.

Precisely as if they should say in an ordinary attack of sickness, "I will go to the druggist's and procure some medicine." "Ah! but what medicine?" "No matter: medicine is medicine." "But how do you know that your present disorder will be benefitted by the medicine you select?" "No matter: I am sick, and there must be something on the shelves of the apothecary, to whom every body resorts, that will cure me."

In the same manner valetudinarians often visit mineral springs. Without knowing at all whether their diseases be inflammatory or the reverse—whether they are plethoric or reduced—whether they need the water as an alterative, diuretic, cathartic or tonic—whether they need the warm, cold or shower bath, or neither :—in short, in utter ignorance of the variety of ways the remedy can be made to bear on various disorders in different constitutions and temperaments, they mostly seem to come with two simple purposes—to deluge the stomach with as much water as they can swallow, and resort frequently to the baths. In this way the plans of the patient are often thwarted, his hopes blasted, and he departs wondering that such crowds should resort to a place where he has received nothing but trouble and disappointment.

CHAPTER III.

THE MEDICINAL CHARACTER OF THE WATERS OF
THE SARATOGA SPRINGS.

THERE are two methods of testing the nature of an agent that is to be introduced into the *materia medica*; viz. by carefully watching and recording the *therapeutical effects* of the article by the bed-side, and by *chemical analysis*. The latter criterion is probably a more fallacious guide than is generally supposed. How often has the practitioner been surprised at the augmented, diminished, or less irritating effects of some off-hand combination, that would be wholly unlooked for by estimating the separate agency of each article.

So of mineral waters. Chemical analysis cannot decide the exact medicinal effects of a new spring, independently of a faithful observation of its operation. For,

1st. Many medicines, such as oxyd of iron, carbonate of iron, pulverized bark, calomel, the gum resins, when in pills, capsicum, ginger, &c. pass through the alimentary passages with very little absorption. Mineral waters, on

the contrary, as may be inferred from the experiments of Dr. Beaumont, are introduced into the blood by the absorbents of the stomach, without any previous deposition or digestion, and thus these mineral agents which, in their minute proportions, would be very inert in a state of powder, are admitted to the inner coat of all the blood-vessels, and to the minutest branches of the secretory apparatus. How widely different these two modes of operation must be, all can readily understand.

2d. Chemical analysis cannot appreciate the qualifying or mutual effects of the ingredients on each other as above stated.

3d. In the language of Dr. James Johnson of London, "Mineral waters contain, in all probability, many agents which we cannot imitate by artificial combinations. This is proved by every day's observation. Thus, the saline, aperient mineral waters will produce ten times more effect than the identical materials artificially dissolved and mixed. The same is true with respect to the chalybeate springs. A grain of iron in them is more tonic than twenty grains exhibited according to the pharmacopæa." "It does not follow, however, that waters contain no active materials

because chemistry is unable to detect them. Powerful agents may be diffused in waters, which are incapable of analysis or which are destructible by the process employed for that purpose. The only sure test is EXPERIENCE of their effect on the human body."

Those patients whose disorders require a cathartic, diuretic or alterative course, will resort to the saline springs. These are the Old Congress, in the south part of the village; New Congress, or Putnam's, some twenty rods north of the former; and the Walton or Iodine spring in the northeast part of the village. The analysis of one or more of these springs will be found near the close of the volume. As the last mentioned spring, since its new construction, has been but one year before the public, its character is not fully established; but from the numerous and careful experiments made and recorded by invalids during the past summer, and the great resort to the spring during the latter part of the season, it is now fairly before the public, and promises to be an exceedingly popular fountain.

As these springs receive the principal share of public attention, I pass by the chalybeate springs without a particular mention of each.

They are more tonic and less aperient than those already described. They are used almost wholly as alteratives and tonics. The Flat Rock spring, just east of the Pavilion, is more resorted to than any other of this class, although the Hamilton, High-Rock, Columbian and some others are substantially of the same character.

CHAPTER IV.

THE MEDICINAL NATURE OF SARATOGA WATERS,
CONTINUED.

THE aperient, diuretic, deobstruent and alterative effects of the Congress water has been fully understood, by the medical faculty and the public. But of its powerfully TONIC nature much less has been known.

The late Dr. Steel had a full understanding of this quality, as appears from his analysis: and so have all the physicians in this vicinity as far as my knowledge extends. These remarks apply, not to the chalybeate springs, which are considered by every body to be bracing; but particularly to the old Congress, the Putnam and the Walton fountains.

Before my residence here, I had been many years prescribing Congress water in bottles to my patients as a pleasant aperient. Its bracing effects I had never suspected. In conversation with a professional brother in Hartford, just before my leaving that city, who has a wide and respectable practice, and who is frequently prescribing Congress water, he seemed

almost to have forgotten whether there was any iron in the article or not. This is, doubtless, true of many physicians who are constantly directing the use of this beverage. But, were these gentlemen stationed here and obliged to watch its daily effects, when taken liberally from the fountains, on the pulse, color, tone and movements of the system; and to witness the unequivocal aggravation of local, inflammatory affections when not counteracted by appropriate remedies, they would appreciate the anxiety felt by the writer that the profession, generally, should understand the exact nature of the case, and give their patients the proper directions and preparation when leaving their homes for Saratoga.

If any suppose the physicians of this watering place have misjudged in this affair, or that the writer is unduly anxious that inflammatory affections should be kept down while patients are in the use of these remedies, let them examine the history of the various mineral waters of Europe. There is no exception to the fact, that whether iron be present or absent, an internal use of these remedies is productive of stimulating and tonic effects. The Buxton waters in England, which con-

tain only 15 grains of saline matter in a gallon, and 6 cubic inches of gaseous products have been found, from a record of 14,906 patients, to be highly stimulating and tonic. The bracing effects of the waters have proved a constant source of embarrassment to Dr. Robertson of the place, and require continual counteraction.

From an extended and careful examination of the treatment adopted at the various watering places in Europe and our country, I have not met with one spring unless such as is simply sulphureous, that does not need a concomitant, reducing treatment in invalids laboring under inflammation or plethora. The cardinal importance of a right understanding of this topic, as it goes to obviate almost the only evil that can result from the use of our waters, is my apology for these extended remarks.

Yet, I must not be understood to say that all need depletion before they come or while here. Far from it. There are many who come with soft, slow pulse, pale countenance, and freedom from inflammatory tendencies, whom the saline springs exactly suit without any previous medication. Crowds of such come and go annually rejoicing in their visit

to these fountains. There are others, too, of so cold and torpid a habit that they need warming and acrid remedies as auxiliaries to the water ; and there are some with such exquisitely irritable nerves as to require—not depletory measures—but anodynes, such as a pill every four hours of extract of hyosciamus, carbonate of ammonia and camphor. I have been pleased to see how visitants of this character, whose bowels have been thrown into great pain and distention by a few tumblers taken in the morning, could be made to bear full and effectual doses of the water by the addition of such a sedative as the one above mentioned.

Still, there is a wide difference between a patient who brings a calm circulation, soft pulse, pale tongue and lips, and exemption from local obstructions, and one who is florid, full, hot, with white fur on the tongue, hard, wiry pulse, and all those symptoms founded on a sanguine temperament and subacute or chronic, local inflammation.

The same disease, according to our imperfect nomenclature, needs the two opposite modes of treatment. In *rheumatism*, for example, one patient may have been long afflict-

ed without any active inflammation. His joints are stiff, and he feels the regular augmentation of his troubles from a cold, north east storm. But, he is thin, pale, feeble, and his pulse is uniformly soft and slow. Such cases, whether chronic rheumatism, sciatica or lumbago, will find most decided relief from drinking and bathing.

But if the disease be accompanied with heat, swelling and pain of joints, aggravated by warm applications and motion, a white tongue and *hard pulse*, the most direct and positive injury must result from the potations and hot bathing, unless the system be brought *below* the grade of inordinate action.

CHAPTER V.

THE COMPARATIVE ADVANTAGES OF SARATOGA
SPRINGS AS A RESORT FOR INVALIDS.

THE first topic to which the attention of the reader is called in considering the peculiarities of Saratoga as a watering place, is *the condition of the atmosphere of this place*. It would be idle to attempt to prove to my readers that a "change of air" simply, is often and unequivocally a curative remedy. The profession, generally, are now united in the acknowledged benefits resulting from change of atmosphere. The plains of Saratoga are remarkable for an arid surface and a dry air. The soil here, being alluvial and sandy, the atmosphere contains a very small share of moisture ; so small, indeed, that I have never discovered any appearance of mould on my books or shoes ; and intelligent people who have resided in the north part of the village many years, say they have never seen such an occurrence.

Add to the dry and bracing nature of this atmosphere, the highly balsamic or rather turpentine qualities with which it is impregnated,

by the numerous pines and other forest trees that have been wisely allowed to remain in and around this beautiful village, and you will perceive at once that these considerations are by no means to be overlooked by invalids who are projecting the means of gaining health abroad. They especially concern those who reside on our sea-board, on the banks of rivers, and in low, clayey soils. Independently of the other powerful attractions for invalids at Saratoga, the pure and balsamic atmosphere should, of itself, induce many to make trial of the location.

Another topic to which I wish to call the attention of the reader is, *the agreeable and delicious qualities of the waters of Saratoga*. I have studied minutely various authors on the mineral waters of Europe and America, since my residence here ; but I truly do not find in nature so admirable a combination for chronic diseases as is to be found in the various springs scattered along this valley. I need not tell my readers that a course of well selected laxatives is, of itself, sufficient to remove a multitude of chronic complaints. This is universally understood. What, then, should we not expect from daily, periodical evacuations by a

medicine, delicious, cool, exhilarating, full of agreeable, enlivening qualities and containing salts, antacids, lime, iron and even iodine? These remarks apply only to the saline springs, or those which contain the least proportion of iron, and without alluding to the various methods of internal and external administration of all these waters.

The efficacy of our springs, upon many of the unprecedented throng of 1839, was, indeed, most gratifying. Many more recoveries took place in this than in the preceding summer. Some cases of recovery occurred in patients who had tried the excellent springs of Virginia in vain.

In an excursion last autumn, in some of our cities, I met with many who volunteered the expression of their gratitude for having visited Saratoga, and recovered their former health.

Similar testimonies appeared in the public prints during the summer and autumn. A single one I beg leave to introduce.

“Steam Boat Erie, North River Aug. 26, 1839.

“*Mr. Editor*—I am now on my return from Saratoga Springs, where I have spent three weeks greatly to the benefit of my health.

When I arrived there it was with some difficulty that I walked from the car house to the Temperance House. I can now walk two or three miles without much fatigue. The effect of the mineral waters on my system has been most salutary. The same is true of many of my old acquaintances. Many seem to think that these waters are the "Matchless Sensitive" for almost every disease that affects the human race. Their medicinal properties are indeed wonderful, and many of the cures which they effect border nearly on the miraculous. If their regenerating effect on the inner man were as great as it generally is on the outer man, the pleasant village of Saratoga might indeed be a garden of Paradise."

R. G. W.

But on this subject I must not enlarge. "Selfishness," "village interest," "private emolument"—may have already flitted through the mind of the reader. Well, let that pass. Whatever motives may have contributed to this publication and the present remarks, the invalid has only to consult his *own* interest in weighing the above and many other similar testimonies that might be adduced: the writer

only claiming that common humanity and sympathy for his fellow sufferers through which every one, who has been rescued from disease himself or has had his friends so rescued, is prone to recommend the remedy to his acquaintances. This license, I claim, witnessing what I have on this post of observation; and feel that I should be recreant to the professional responsibility I owe my fellow-men, did I not contribute my humble effort to diffuse widely the information of the healing influences of these waters.

3. Another topic which should not pass unnoticed, is a *proper attention to diet and regimen*. Saratoga is proverbially a hungry place. A powerful appetite is produced by the waters. It is the interest of the boarding houses to provide an inviting table. What, then, shall guard the craving stomach of the valetudinarian from nullifying all the expected benefits of his visit? The family physician may do much before the patient leaves home. A watchful self-denial of the invalid, himself, can do more. As he convalesces, however, it is not only allowable but proper that he should gradually, but cautiously, enlarge his diet so as to give full employment to the stomach as it regains its powers.

Lastly, the family physician should state fully and honestly to the patient the *absolute necessity of a thorough and extended trial of the waters*. Experienced practitioners know very well that a complex medicine which can, by internal and external exhibition, be made to operate as an alterative, deobstruent, antacid, aperient, diuretic and tonic, should not be abandoned on a slight trial. They know, too, what their patients cannot appreciate, the indispensable necessity of some extent of time in removing deep seated and long continued maladies. How preposterous, then, for invalids who have been laboring under the influence of *established* disease for months or years, to hope they can eradicate and banish these diseased processes in one or two weeks!

The physicians here, and the keepers of boarding houses know this full well: but how can they retain invalids whose own family physician has not urged to a faithful trial of the remedy?

CHAPTER VI.

THE INTERNAL USE OF THE SARATOGA WATERS.

WE now proceed to offer some plain directions for the use of visitants, on their arrival at the springs.

The first enquiry made by the invalid after suitable lodgings are procured is, of course, "how shall I take the waters?" "When begin?" "What springs?" "In what quantities and at what hours?" These questions can be solved at every corner. In the language of the late Dr. Steel, "there are numerous persons who flock about the springs during the drinking season, without any knowledge of the composition of the waters, and little or none of their effects, who contrive to dispose of their directions to the ignorant and unwary, with no other effect than to injure the reputation of the water and destroy the prospects of the diseased."—*Steele's Analysis*, p. 184.

In one thing almost all visitants are agreed: to make their first resort to the Old Congress spring. The long tried efficacy of this celebrated fountain is too well known, to need any encomiums in this place. I had occa-

sion to pass down Broadway many times last season during the hour of the morning potations; and such were the throngs in waiting, that it really seemed impossible that they should all be supplied from one small fountain.

When it is considered that a great part of the civilized world is sending its delegates here to drink—or its orders for bottling and sending abroad the water—we see at once the responsible and important relation held by Dr. Clark, the owner, to the public. We see, too, the great necessity both to the public and to the prosperity of the village, that other fountains of different composition and qualities should, if possible, be discovered; and it should be a matter of common congratulation here and elsewhere, that the persevering and expensive efforts of several gentlemen in this place for the establishment of other mineral springs, bid fair to be crowned not only with remuneration but with public benefit.

There should not be a city nor village of any size in America, that is not furnished annually with a full supply of the health-giving waters of Saratoga.

But, to return to the subject. A great proportion of valetudinarians may commence at

once the internal use of the Congress or of the Iodine or Walton spring which is situated in the northeast part of the village. I might, probably, with safety include the New Congress in the above specification; but as Mr. Putnam has never furnished the public with an authentic analysis, nor with any well attested series of experiments on the internal use of the water, I decline taking any responsibility except to say that the water is highly pungent and agreeable, and is certainly diuretic as well as aperient. I have known, too, many intelligent and observing visitors who attributed to this spring, solely, their convalescence from disease.

The proper time to take these waters, as a cathartic, is in the morning and in the morning only. The reasons appear to me to be obvious. There has a period of sixteen hours elapsed since the principal meal of the preceding day, and eleven hours from the slight repast of the evening. In people of weak or irritable stomachs, this is the only time in the 24 hours in which the digestive organs are not engaged in the solution and absorption of aliment. This, then, is the precise occasion to interpose a mild, exhilarating and efficient cathartic; and this should be taken so early and

in such quantities, as thoroughly to evacuate all the remains of the preceding day's digestion, and to make so much impression on the mucous membranes of the alimentary canal as to rectify the process of secretion itself.

This is the true Abernethian road to health to multitudes of bilious and dyspeptic invalids; and will stand the most approved method of medication, notwithstanding the numerous and laudable efforts that are made by the fraternity to discover a better way.

From one pint to three pints is the quantity prescribed by Dr. Steel, and the prescription is right. The earlier in the morning the better. Whatever be the quantity that is ultimately found necessary by each person, it should be taken in three portions and with short intervals between, occupying 30 or 40 minutes in all. Brisk exercise by walking or otherwise is desirable during this time and for a short period afterwards. And it is proper that at least an hour, and, better, an hour and a half should elapse between the last potation and breakfast.

I knew an intelligent gentleman in the spring of 1839, when the mornings were quite cold, dress at four, walk nearly half a mile to the

spring, finish drinking, and return to his bed, where he became thoroughly warm in season to allow him a walk after the sun was up and before breakfast.

To patients of feeble stomach and low temperature, the contents of a well corked bottle which has stood in the lodging room over night, can be taken during the process of dressing, after which the walk to the spring will prepare them for the remaining portion. Or, the requisite quantity can be brought from the spring in the morning, and the bottles immersed in a kettle of warm water a few minutes previous to drinking. Although a considerable quantity of the carbonic acid escapes, the water tastes much better than one would expect who has not tried it.

Yet the invalid should never be deterred by indolence, irresolution or imaginary fears from going to the spring; as it is incomparably better to take the beverage from the fountain in the midst of the absorbing and even picturesque scenes of the "dipping-room," and to take it fresh, too, from the bosom of the earth. The apprehension that valuable elementary principles may possibly escape from the bottle, and that there are ingredients in mineral wa-

ters that the present chemical processes have never appreciated, will appear less absurd the more it is reflected upon.

Intelligent individuals have recovered here in three or four weeks while drinking at the springs, who during the preceding months have been able just to hold their disease at bay by a free use of the Congress water in bottles at home. I have a number of such cases on record, and would introduce them did my prescribed limits permit. Now is it supposable that the air and amusements of Saratoga could make this striking difference? or is there an energy and a health-giving power in the medicine in the exact constitution and locality which nature assigns it, that are not to be found when it has been sometime separated from the place of its original formation?

It is a matter of every day's discussion among the visitants here, whether the Congress spring has not lost its strength? If, by strength, is meant pungency or smartness of taste, it is undoubtedly true that this water both loses and gains strength daily. For this pungency is dependent, greatly, on the carbonic acid gas with which the fluid is impregnated; and this gas, as shown by numerous experiments, varies

in quantity continually. Yet "as the water appears always to retain in combination considerably more than its bulk, besides a considerable quantity of disengaged or free carbonic acid," (Steel's Analysis p. 99,) the presence or absence of this uncombined acid has little to do with a single one of the various therapeutic effects that are sought in the use of this beverage.

The loss of this *superfluous* acid cannot occasion the deposition of any of the known, solid constituents. Besides, the gustatory organs—the nerves of the palate and tongue—are so much affected by the morbid secretions of the mouth and stomach and by the lapse of years, that the sensations produced by swallowing the water are extremely deceptive. I have purposely interrogated several intelligent persons who have made their morning visits to the spring within a few minutes of each other, whose accounts of the comparative smartness of the water were totally at variance.

One has been found to pronounce the water flat and insipid, while another has never known it more lively and pungent. This discrepancy of testimony between those who drink at the

same time, can manifestly arise from nothing else than the varying sensibility of the nerves of taste: and the accuracy of these nerves is in no case more at fault than in appreciating articles of a subacid nature.

But what proof can there be that the *saline ingredients* of this spring have undergone any change? If not, the *strength* of the medicine is substantially the same. No great alteration has ever been detected by the frequent examinations of the late Dr. Steel, which were carried on for a series of years. Suppose, however, that changes in the solid constituents were known to be taking place from time to time. Would it not be exactly as probable that the medicinal properties would be improved by the alteration as deteriorated?

There is, however, another method of testing the strength of the water, which I have ever considered paramount to that of chemical analysis. So much was said on this subject, both here and abroad, in the summer of 1838, that, during the following winter, I took an opportunity to enquire of a number of the oldest and most trusty of our citizens, how many more tumblers of the Congress water it required now to produce a given cathartic effect than it did 10, 15 or 20 years since.

The reader may, if he chooses, discard the testimony of these individuals, because they may possibly have had some interest in the prosperity of the village. Every man is at liberty to prescribe his own rules of scanning the sources of his information. But to myself, the fact that not one of these persons had any direct interest in the spring, and that their testimony to the unaltered effect of the water, both as a cathartic, diuretic and stimulant, was uniform without one exception, was wholly conclusive.

Moreover, there is occasionally an invalid from abroad who spends the whole winter here, who breaks his path through the snow to the spring in the morning, and finds no variation in the medicinal power of the water during the year.

I have, myself, in the middle of winter, often been the first at the spring in the morning in quest of my favorite beverage, and never could discover, either in its taste or effects, any essential variation. And it ought to be known to invalids abroad, that chronic diseases improve as rapidly from the internal use of these waters in winter as in summer: and, although the beverage taken from the fountain

in a summer's morning, seems cold and chilling,—absurd as it may appear—it is positively warming and exhilarating during the cold of winter.

But enough has been said—perhaps quite too much—on the comparative strength of the Congress water. Judging from the concourse of strangers here during the two past seasons, particularly the last, these speculations which have been bandied about cannot seriously have misled the public, or deterred invalids from seeking their true interests.

To those who resort to Putnam's new Congress spring and take it principally as a cathartic, the same rules apply. It should be taken, for this purpose, only in the morning, and from six to ten tumblers. Several visitants have informed me that the evacuations from the bowels procured by this spring, were less watery than by the old Congress, while at the same time it operated more on the kidneys.

The Iodine spring elicited much enquiry and many comparisons during the summer of 1839. As the old Congress contains nearly twice as much saline matter, according to chemical analysis, as the Iodine fountain, it

was supposed that its cathartic effects must be proportionate. But, the great difference of weight exists principally in the different amount of muriate of soda—common table salt—and carbonate of lime, or chalk. There are 200 grains more of table salt in one gallon of the Congress than in the Iodine, and four times the amount of chalk.

Whether the purgative properties of the Congress water are increased at all by the great predominance of these articles is doubtful. The carbonate of magnesia, on the contrary, which is the most decidedly aperient agent in the whole composition, is in the proportion of 75 grains in the Iodine to 95 in the Congress. We should be unable, therefore, to predict with certainty which of the two springs would prove most active as a cathartic.

To test this point, several accurate observers in 1839 tried one spring for two or three mornings, and then the other for the same time and in the same quantities. I should think there may have been thirty individuals who made these experiments, and, among them, several physicians. From the results of the whole of these observations, there appeared but little difference in the laxative properties

of the two fountains. If there was any, it was in favor of the Congress. Further experiments will soon be so multiplied as to lead to conclusions sufficiently definite for all useful purposes.

In comparing these two springs, it should be remembered that they produce various other medicinal effects in the system than the one just considered. If the analyses of Prof. Emmons of Albany, and of Dr. Chilton of New York, are correct, the Walton or Iodine spring contains only about one fifth the amount of iron there is in the Congress. This circumstance, so far as chemistry is a guide, would lead us to prefer the Iodine spring in all cases in which an inflammatory condition of the patient, as indicated by hard pulse, florid countenance or local pain and tenderness on pressure, would lead us to fear the stimulating effects that result from mineral waters in general.

Professor Emmons remarks, "the freedom of this water from iron is truly remarkable, and supplies a desideratum which has long been wanting, viz. a water which may be drank by a certain class of invalids with whom iron proves a decided injury." Yet I would rather settle even *this point* by careful and multiplied

observations of the medicinal effects than by the most elaborate analysis.

Although the positive amount of hydriodate of soda is precisely the same in both these fountains, yet the *relative* amount is largest in the Iodine spring; hence, probably, the name which the owners have given it. So far as this operates, it gives this the preference in all the varieties of scrofula, goitre, &c.

As the quantity of table salt is so small, comparatively, in the Iodine spring, this water should never be drank in open vessels at the boarding houses; for when the superabundant carbonic acid has escaped, the water is much less pungent and lively than when swallowed at the dipping room: the absence of the salt rendering it somewhat flat and insipid. At the fountain, no water in the world can be more palatable. Its amount of carbonic acid, according to Professor Emmons, is unparalleled; containing fifteen cubic inches in the gallon more than the Congress spring.

It is probably owing to this superabundance of gas, as well as to the small proportion of table salt, that the water proves so light to the stomach, and that it so seldom (according to the reports thus far) produces pain of stom-

ach, flatulence and distention, even when taken in unreasonably large quantities.

The new fountain of Mr. Benjamin Hall, a few rods east of the Pavilion garden, has yet had no analysis; nor have sufficient observations been made to establish a definite character. It is, no doubt, an excellent water, and certainly very agreeable to the taste. In any other part of the world—with any other competition than what is encountered in this wonderful locality—this single spring would be deemed invaluable.

In concluding the subject of the cathartic effects of these waters it should be added, that in case six or eight tumblers in the morning prove inadequate to produce the desired object, instead of adding to the quantity during the day, the attempt should be wholly relinquished till the following morning. It will not then be expedient to increase the quantity of water, but to aid its operation by some thorough, cathartic medicine. If the patient be of full habit, blue pills taken several evenings on going to bed, may be suitable; or active doses of calomel, two or three times at the same hour. A table-spoonfull of Epsom salts, or a dose of calcined magnesia, may be taken

at bedtime or with the first tumbler in the morning.

In feeble habits, some of the compound, gum-resinous pills, or a few grains of rhubarb may be preferable. Whatever article is selected as an auxiliary remedy, enough should be taken to ensure thorough operations, after which in general the water alone will be preferable.

CHAPTER VII.

THE INTERNAL USE OF THE SARATOGA WATERS,
CONTINUED.

So great a majority of the complaints that appear at these springs require a free and copious use of the water in the morning, that the possibility of their being so taken as to prove directly alterative and tonic, without their ordinary cathartic effects, may be wholly unknown to many of the visitants. The late Dr. Steel used to direct some of his patients to take of the Congress in the morning as a laxative, and a tumbler of the chalybeate springs two or three times during the middle and latter part of the day. There are habits in which this course proves exactly right, as I have myself repeatedly witnessed.

But the thought that the Congress water could be taken from one to two tumblers before each meal and at the hour of rest—not as a purgative—but expressly to be retained as long as possible in the circulating mass, and in this way gradually to produce a new condition of the solids and fluids, improving the strength, appetite and color, regulating the secretions

of the stomach, bowels, liver, kidneys &c. and proving rapidly tonic and deobstruent—never occurred to me till I found one of the most intelligent and popular physicians in New York city taking the Congress in this manner in the early part of the season of '38.

This gentleman had been repeatedly to the Virginia springs : and, after much reflection, had concluded that the best manner in which he could take the water during the few days his pressing engagements at home allowed him to spend in Saratoga, would be in that above described.

To the long continued invalid who has painfully learned the difficulty of escaping from under the hands of disease, this mode of medication will seem at first view as consistent and rational. He has abandoned all hope of being cured by a few powerful doses of *any* medicine. His thoughts are upon a gradual removal of diseased processes and restoration of healthy ones ; and, if he is true to his own interests, he has come to a settled conviction, that time is a necessary ingredient in his recovery, and to an equally settled determination, that, if a few weeks of hopeful amendment do not *establish* his health, he will spend months or years in its attainment.

Within three days of writing these paragraphs, I have received a communication from a gentleman in one of our cities, who for ten or fifteen years has had so much disease of the digestive and biliary apparatus as to compel him to abandon all the pleasures of eating, and to live wholly on unbolted wheat bread and vegetables, not even allowing himself butter. But when we consider his infirmities, his fluctuations of strength and spirits, his constant liability to be thwarted in any proposed plan of usefulness or profit, his embarrassments from change of diet while journeying, and his great deprivation of what others deem essential comforts, I ask what is life to him?

I ask, too, whither he would not migrate, what employment he would not pursue, what vocation not follow, what voyages and climates not encounter,—could he enjoy those physical sensations, those buoyant feelings, that freedom from pain, irritation and lassitude which are found in the comprehension of that delightful little word—HEALTH?

Shall I be credited when I say that this gentleman is of easy fortune, of small family, under no necessity to labor, has been to these fountains repeatedly and always with marked

benefit: nay, that he admits to me his full belief that a continuance here of one or two years would result in the entire *establishment* of his health:—I repeat, shall I be credited when I say that he is yet hesitating whether to transfer his family to this village as many others have done and are now doing?

Here is an enigma which I confess myself unable to solve. I know somewhat of the comforts of home, of neighborhood, of congenial institutions. I have the happiness to know, too, from many years' trial, the social and intellectual attractions, the religious order, and the unpretending, but real and solid friendship of the inhabitants of one of our New England cities; yet what are all these to health? Besides, the men whose diseases have led them to cast anchor by the side of these fountains, have not expatriated themselves. We have churches, schools, delightful walks which are comfortably dry from early spring, a dry and bracing atmosphere, village papers, mails, railroad conveyances, and abundance of the conveniences and comforts of life.

Even in winter, this is a lively, bustling village. Instead of the dullness, insipidity and intellectual stagnation which are uniformly sup-

posed to exist here in the winter, there are life, intercourse, friendship, business, action, literature and social circles : and although the thermometer marks a very low temperature, yet such is the bracing and buoyant quality of the air that nobody seems to regard it. The Bostonian or New Yorker, who quails under the riddling and penetrating North Easter when the thermometer is at freezing point, would experience not a whit more suffering here with the wind in the same quarter and the thermometer at zero.

Citizens, here, in ordinary health, instead of dreading, enjoy the long season of sleighing as well as the early settling of the ground and dry walking, which the continued covering of snow secures in the spring.

But I must not prolong this sketch of Saratoga, imperfect as it is. I must not dwell at all on the brilliant and fascinating scenes of Saratoga in the summer. Only one thing I must beg pardon for saying. The single circumstance which I consider more than any other fascinates the inhabitants and fixes them here, is the *multiplex yet select* nature of the thousands of the visitants resorting to the place.

I have been in the large houses and among the throngs of the city. But life there is real monotony in comparison with the ever varying and brilliant groups that are seen in the streets and in the saloons of our large houses. Although there may be individuals of little worth in these establishments, yet in general they contain the *elite* of the country; and the man who gains access to them has obtained a position for studying human character and gaining general information, which, I must be allowed to say, I do not believe is elsewhere found in America, unless at the seat of our national government.

But to return to the consideration of a *per-severing* use of the Saratoga waters, and particularly as an alterative. This manner of using them consists in taking them in the quantity, ordinarily, of one tumbler and a half, half an hour before, or just after each meal, and at the hour of rest. Two tumblers are not too much for an adult, provided they do not prove decidedly cathartic. The object is that the thirty-seven grains of saline matter in each tumbler should remain in the circulating fluids as long as possible. This method might be useful to very many: but the cases in which it has

proved, under my prescription during the two seasons past, most happy, are those where the disease is of long standing and where the system requires a tonic and invigorating course.

From the reports of others, it appears highly probable that this same method of taking what are called the iron or chalybeate fountains, has operated very much in the way above pointed out. But I have confined my patients, hitherto, to the waters of the Congress, Iodine and Putnam's springs; and it is only because the effects have been so decidedly favorable in using these, that I am proposing their continued employment. It is impossible that I should describe minutely all the shades of disease in which this course is likely to prove beneficial: but the plan may be illustrated by a brief narration of two or three cases in which this treatment was adopted.

CASE I.

J. R., an interesting boy of about 11 years of age, from one of the western cities of this state, was left here in June '39, with ENLARGED TONSILS. This disease is now so prevalent that many know its symptoms, and all know that the operation of cutting off the glands is

quite common. But the excision of these enlarged glands by a surgical operation removes only one of the annoying effects of a general disorder. The process had been tried in his case ; yet when he came under my care his tonsils were very large, there was great irritation about the throat, as evinced by a constant and distressing hawking ; he had a pale, doughy face and poor appetite, with general languor and debility.

A tumbler and a half of the Congress water, taken from the spring, was prescribed three or four times a day, and the cold, mineral shower bath every second day. It was not one week before his appetite was greatly improved and thenceforward he ate very freely and relished and digested every thing. He attended Mr. Bangs's academy steadily. After staying between two and three months, he returned to his parents in the following condition. He has scarcely any trouble from thick, viscid phlegm in his throat. He sleeps well, the glands are nearly natural, a healthy color has supplanted the dark dingy hue of his cheek, he has great vivacity, his movements are vigorous, his limbs plump ; in short, he has entire health. During the last half of the course he

left the Congress and took the Iodine spring. I could perceive no difference in the rapidity of his convalescence. The cure of this deep seated disease demonstrates the power of these waters when taken as an alterative or tonic.

CASE II.

SCROFULA, WITH STRONG TENDENCY TO PULMONARY CONSUMPTION.

July 19, 1839, J. W., a single lady from C. ; pulse 66 and soft ; skin cool and moist ; countenance bilious. Has lost six brothers and sisters by consumption. Tumours nearly as large as marbles beneath the skin. Chest narrow. Breath scanty. Habit always spare. Generally feeble. Appetite absolutely gone. Sour stomach ; eructations ; frequent head ache. She remained till Sept. 11th. She took two tumblers of the Congress three times daily, half an hour before her meals. This quantity proved agreeably laxative, though not cathartic. The last half of the time she chose the Walton or Iodine spring, on account of the taste, and she discovered no difference

in the medicinal effects. She went to the spring for every potation, rain or shine. She also took a hot bath every second day, at a temperature from 105° to 110° .

She leaves us with strong, uniform appetite, eating substantial food without trouble, her strength much increased, her countenance clear and bright, and with every proof of renovated health.

January 25th, 1840. Miss W. is as well in all respects at least, as when she left the springs.

CASE III.

SCROFULOUS ENLARGEMENT OF ALL THE JOINTS, EMACIATION, PAIN, &C.

June 26, 1839. E. K. aged 7 years ; from Vermont. Has been sick three years. Her joints greatly enlarged. Limbs and body almost literally destitute of flesh. Skin waxy and transparent. Action of the heart tumultuous. Pulse 84 and soft. Tongue red. Appetite and bowels tolerable. Cannot walk. Has constant pain, and must be turned in bed many times a night on this account. Counte-

nance extremely sallow and cadaverous. Has been bled and taken many medicines.

After taking anodynes and active cathartics a few days, she was put upon one tumbler of the Congress water three or four times daily, and a bath of mineral water every second day at 95°, accompanied, while in the bath, by frictions to her joints and limbs with a ball made of sulphur enclosed in a piece of crash towel. In two or three weeks she took two tumblers before each meal with great relish, and without any unpleasant cathartic effect.

Her parents were very reluctantly compelled to return to Vermont July 29th. Her improvement to that time was truly wonderful. She is very hungry. The aspect of her skin is wholly changed. She sleeps all night, has a decided increase of strength, flesh and spirits ; and every thing indicates that should this poor, emaciated cripple remain here from six to twelve months, pursuing this same course, she would undergo an entire revolution and recovery.

I have on record a number of cases equally confirmatory of this method of taking the waters ; but the limits I have prescribed myself forbid their insertion. Enough has been ad-

duced to show the power of this remedy when taken in this gradual manner ; and to induce public attention to a method of administration that demands a more extended trial and observation.

CHAPTER VIII.

THE EXTERNAL USE OF THE WATERS. BATHS.

Cold Bath from 32° to 65° .

Tepid Bath from 65° to 85° .

Warm Bath from 85° to 97° .

Hot Bath upwards of 97° .

A bath at about 90° Fahrenheit, whether of mineral or simple water, is a pleasant thing. It is cleanly, refreshing and soothing ; and, like a pleasant ride, or the society of a long absent friend, is *auxiliary* to health. But it is not strictly a medicinal agent at this temperature. Chronic maladies are cured by "instituting states or conditions incompatible with morbid action." But this bath makes no appreciable inroad on morbid action. The patient is conscious of no shock, no impression, no inconvenience, no perceptible change. It is a capital indulgence, and every way desirable in point of health and comfort ; though, at this temperature, a doubtful *remedy*.

But the invalid who has been forced from his home and obliged to undergo the inconveniences of this thronged place, does not come hither to be *amused* with remedies. He

wants *every* prescribed agent to tell on his disease. He knows that all *necessary* prescriptions from physicians, and all necessary medicines are a matter of economy to one who has already sacrificed so much in coming. But it is nonsense to be wasting his time with ambiguous remedies.

What then are the principles which should guide the invalid or his physician in the employment of baths? Will it be deemed a gratuitous or unfounded acknowledgment to say that the application of baths to the removal of diseases, is, among the faculty in general, one of the most vague and unsettled subjects? There are fixed notions about the use of the lancet, emetics, cathartics, blisters, anodynes and tonics. But select a given patient and summon a dozen physicians in consultation any where, and let them decide. And if there is a majority in favor of the bath, let each assign the exact temperature, the length of time and frequency of repetition, and see if the above position is not confirmed.

Perhaps this discrepancy of opinion is only imaginary on the part of the writer. If so, he begs the pardon of his brethren. Yet it is his honest and full belief, that if they would

express their exact sentiments on this point; they would universally concur with him. This vagueness of the principles of baths is by no means confined to the profession. Every man has a creed. The invalid has one,—the keeper of the boarding house has one,—and the owners and attendants of the baths have theirs.

Let a physician here furnish an invalid with directions to take a bath of such high or low temperature and of such duration that it shall give a decisive blow to the disease, and the directions will, very possibly, meet with a dozen comments and condemnations before they reach the bath house. At that place great firmness and decision may be needed on the part of the patient, as well as unshaken confidence in the prudence and discrimination of his medical adviser ; else these well meaning and otherwise judicious attendants may overrule and modify the whole procedure. It may be necessary, too, for the patient or his friends to see with their own eyes that the thermometer stands at the point prescribed. Did not some professional experience lead to these intimations they would not meet the eye of the invalid.

My limits forbid the attempt to describe fully the popular notions about baths. One sentiment is almost universal, viz. that if a patient, whether feeble or stout—spare or plethoric—feels a glow after the cold or shower bath, it is the proper remedy. The mechanical effect of cold in contracting the muscular fibres and the *sensation* of warmth—although the animal heat is a long time actually lower than before the shock—are proof enough that the whole effect is not only invigorating but subversive of disease.

There is a similar agreement about the hot bath. If the person feels faint and feeble 30 or 60 minutes after leaving it and while in it, the measure is condemned—although for hours the skin and cellular substance may contain two or three pounds of extra blood, to the great relief of the internal organs—profuse and general perspiration continue equally long—the lips and countenance change from a pale to a florid aspect, the joints become flexible and all the sensations, after a few hours, become decidedly improved.

At these fountains, where the application of a stimulating, saline and gaseous liquid to the whole external surface is often performed on

from fifty to one hundred individuals daily, the responsibility of prescribing baths becomes a matter of serious import, and demands the anxious consideration of every practitioner here.

Very early in the season of '38, P. C. Esq. from Massachusetts, had been under my care about two weeks for rheumatism of long standing, and had been rapidly improving under the combined influence of Congress water and active depletion. At that time he took, with my consent, a bath at 100°. The effect was most unhappy. All the original stiffness and pain of joints, feverishness, hard pulse and feeling of stricture around the abdomen returned, and it required several days of the previous course to restore him to the same condition as before the bath.

This painful and mortifying incident led me to an earnest investigation of the principles of baths, and of all the authors within my reach. Yet the treatise on Baths and Mineral Waters, by Dr. Bell, of Philadelphia, was worth more than all the rest to me; and I do most cordially urge its perusal upon all who desire to possess accurate notions on bathing.

In that book I found a criterion which I

looked for in vain in Currie, Jackson, Scudamore and other distinguished writers on this subject—a criterion which has, in no one instance, to my knowledge, during two seasons, led me astray in its application to the diversified phases of disease—and one which I can most honestly, perhaps too credulously, recommend to the adoption of my fellow practitioners here and throughout the country, as a safe and intelligible guide.

The principle is simply this:—*that in all febrile and inflammatory diseases, whether acute or chronic, in short, in all diseases—wherever the lancet is called for, there also will the cold and shower bath be suitable; and where the lancet would be injurious, there should the hot bath be used.* The simplicity of this rule will probably startle some. It may be enquired, “would you not take into the account such circumstances as plethoric habit, florid face, red tongue, the previous effect of warm and cold applications and of tonic or debilitating remedies?” Certainly. But I say most decidedly and from many trials, that by throwing one’s whole responsibility upon *the exact condition of the pulse*, and making this paramount to all other diagnostic symptoms,

though not rejecting them as auxiliary guides, a physician will most effectually and infallibly bestow upon baths their powerful and just instrumentality in the removal of disease.

Let us apply this principle to some well known disease, for example, *rheumatism*. It is well understood at watering places, that baths of the same temperature sometimes injure and sometimes benefit this class of patients. The cold bath has, in many instances, rapidly removed powerful attacks of rheumatism.

Some winters ago, Mr. A. H. A., of this village, had been a considerable time under the anxious attendance of Dr. Steel, for a severe attack of acute rheumatism. At length, at the urgent solicitation of the patient, he was taken from his bed by several men, placed in a large tub and two pailfulls of cold, mineral water poured on him through a sieve. He was then rubbed dry and placed in bed between two warm blankets. This process was subsequently repeated; and in one or two weeks the patient was below stairs and walking the streets. He speedily recovered perfectly. Dr. Clark, the owner of the Congress spring, knew the circumstances, and told me

he could refer me to a number of similar cases in this vicinity.

A member of Clark's Expedition beyond the Rocky Mountains, was cured of an obstinate rheumatism, while remote from professional aid, by twenty-five immersions in as many days, in the river through a hole cut in the ice. Each immersion was accompanied with shampooing by the Indian Doctor while in the water, and followed by frictions before a warm fire.

A Mr. E. W. of Rome, N. Y., having lost all hope of recovery, crawled to a river whose borders were covered with ice, and lay in the water as a bath. The disorder received such an impression that he was speedily restored to health. Mr. N. of New York city, was accidentally thrown into the sea, in winter, near Stratford Point, and cured of rheumatism.

I must not be more particular. Every man of extensive practice could easily add to the above list. My own case book would afford a number of instances in which baths at 75° to 80° were strikingly useful.

The hot bath, on the contrary, every body knows to have been wonderfully useful in rheumatic complaints. Yet what numbers

have been greatly and fatally injured in this same disease and by the same remedy, the hot bath. I could adduce abundant proofs of this from authors, from the history of watering places and from my own journal. Who then shall draw the line, and what shall it be? I answer, Dr. Bell, above mentioned, has drawn it precisely and intelligibly.

I had a patient in August '39, Gen. J. A. N. of New York state, of florid countenance, short neck, full habit, weight 186 lbs.—fat and muscular—yet whose pulse was only 76, soft and perfectly compressible. Here, thought I, as he hobbled into my office, and stated his disease, is the man whom a hot bath would utterly upset or destroy. Yet on a thorough examination, relying more on his *soft pulse* than on all other symptoms, I ordered him, in addition to the internal use of the water, to take baths of mineral water fifteen minutes daily of 106°. To say his recovery was rapid, does not convey the meaning. He was well in two weeks, not a vestige of the rheumatism remaining.

The illustration of this principle in the treatment of rheumatism, must suffice for all diseases. Disorders of the same name require,

in different instances, the adoption of different remedies. As far as baths are concerned, a most scrupulous investigation of the pulse—carefully distinguishing when it is hard and wiry and when soft and compressible—will form a safe guide in all ordinary cases. It should not be forgotten, however, that the daily use of hot baths may prove so stimulating as to be inadmissible when the patient recovers a certain degree of tone; nor that the cold bath may be so sedative as to require to be discontinued.

I close this discussion by transcribing an entry in my journal towards the close of the season of 1839. “I have been prescribing mineral baths, many, daily, for weeks. If the pulse is hard—demanding calomel, Epsom salts, antimonials or bleeding—whatever be the color or heat of the skin or the muscular strength—I prescribed a bath from 75° to 85° , or cold shower, and have thus far had no reason for regret or mortification.

On the contrary, if the pulse is soft and slow, I have without hesitation prescribed the hot bath from 105° to 110° , and even to 112° , without any untoward result, although great languor may have been experienced while in

the baths. If the patient had cool, perspirable skin, pale face, pale lips and tongue, the hot bath seemed still more clearly indicated."

Whatever may be the result of future observations, I can truly say, that, thus far, since adopting this simple criterion, the ordering of baths has ceased to be a matter of painful uncertainty and doubt; and, moreover, that I have experienced extreme gratification in finding that when an accurate discrimination is made, and the remedy is boldly applied from a low temperature up to 110° and 112° , according to the nature of each case, it has become a much more efficient auxiliary, and in many cases, the leading measure in producing rapid convalescence.

CONGRESS SPRING.

Analysis by Dr. Steel.

One gallon, or 231 cubic inches, contains the following substances, viz.

Chloride of Sodium, (sea salt,)	385.0
Hydriodate of Soda,	3.5
Bicarbonate of Soda,	8.982
Bicarbonate of Magnesia,	95.788
Carbonate of Lime,	98.098
Carbonate of Iron,	5.075
Silex,	1.5
Hydro-bromate of potash, a trace ;	
	<hr/>
	597.943 grs.
Carbonic acid gas,	311
Atmospheric air,	7
	<hr/>
Gaseous contents,	318 cubic inches.

WALTON OR IODINE SPRING.

Analysis by Prof. Emmons.

One gallon contains of

Muriate of Soda,	187
Carbonate of Magnesia,	75
Carbonate of Lime,	26
Carbonate of Soda,	2
Carbonate of Iron,	1
Hydriodate of Soda,	3.5
	<hr/>
	294.5 grs.
Carbonic acid gas,	326
Air,	4
	<hr/>
Gaseous contents,	330 cubic inches.





